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Children's Spontaneous Correction of False Beliefs in a Conversation Partner

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Preschool children were tested for their ability to vary the verbal information they offered regarding an object's location depending on whether the person searching for that object was likely to infer or misinfer its location. Older children (mean age: 5 years 3 months) offered information in a selective fashion: If the location of the hidden object could be readily inferred by their conversation partner, they indicated its location only when explicitly asked but if its location was likely to be misinferred, they often indicated that location prior to being explicitly asked. The response pattern of younger children (mean age: 3 years 6 months) was less conclusive. A relatively large number of younger children took matters "into their own hands" and immediately grasped for the concealed object, irrespective of whether its location could be readily inferred. However, the reactions of the remaining 3-year-olds suggest that even at this age children may be sensitive to the likely beliefs of their conversation partner.

A wealth of recent research has shown that young children improve between 3 and 5 years in their understanding of beliefs. This age change is especially evident with respect to false beliefs. Thus, children improve in the ability to predict the way that a false belief will influence a person's actions (Wimmer & Perner, 1983), statements (Gopnik & Astington, 1988; Wimmer & Hartl, 1991), and emotions (Avis & Harris, 1991; Harris, Johnson, Hutton, Andrews, & Cooke, 1989). During this same period, children also improve in

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their ability to produce actions or statements aimed at creating a false belief in another person (Peskin, 1992; Sodian, 1991; Sodian, Taylor, Harris, & Perner, 1991).

Almost without exception, the tasks used to study children's developing understanding of false belief have included an explicit invitation to supply a judgement regarding someone's belief. For example, children are explicitly asked to say what they themselves said or thought about the content of a closed Smartie-box before its real content was revealed, or alternatively what someone else, who has not had access to the latter information, will say or think about its content (Gopnik & Astington, 1988; Mitchell & Lacohée, 1991; Perner, Leekam, & Wimmer, 1987; Wimmer & Hartl, 1991). Even in studies of deception, children have been explicitly asked to trick, mislead, or withhold information from an opponent (Chandler, Fritz, & Hala, 1989; Hala, Chandler, & Fritz, 1991; Sodian et al., 1991) or warned that an opponent will exploit information for his/her own selfish ends (Peskin, 1992; Russell, Mauthner, Sharpe, & Tidswell, 1991; Sodian, 1991). Accordingly, these studies cannot tell us whether children *spontaneously* deploy their understanding of belief in everyday life. The present study aims to make a start in filling this gap by studying the way that young children diagnose and correct an interlocutor's false belief in the course of conversation.

Recent research has highlighted the possibility that children's theory of mind is linked to their language ability. Thus, several studies have shown that there is a correlation between verbal mental age and success on the false belief task (Astington & Jenkins, 1995; Happé, 1995; Jenkins & Astington, 1996). However, such correlational studies do not indicate whether children diagnose a partner's mental states, including his/her beliefs, in the course of conversation. Happé (1993), on the other hand, provides an interesting analysis of this possibility and some pertinent findings. She argues that conversation often calls for an interpretation of the intentions that motivate a partner's utterance. Consider a child who breaks something, and is then told: "You've done a fine job". The child will misunderstand this remark if he/she treats it as an utterance that is intended literally rather than ironically. Happé (1993) went on to show that children's ability to interpret such nonliteral statements correctly is associated with performance on false belief tasks among normal children and children with autism. Even this analysis, however, does not elucidate how an understanding of false belief in particular—as opposed to a more general understanding of mental states such as intentions—might contribute to conversational competence. This was the goal of our study.

In everyday social interaction, children will often encounter a mismatch between people's reactions and what is really the case. For instance, a child's mother might say: "Someone needs to put out the dustbin". A boy who has just carried out that chore without his mother noticing it is likely to correct

his mother's mistake by saying: "I've just done it!" The implicit conversational "contract" that people try to speak the truth *as they know it* (Grice, 1975) combined with the knowledge that the mother did not see the dustbin being taken out, makes it possible for the boy to infer the mother's informational status. Thus, the boy can reasonably assume that his mother mistakenly thinks that he has not carried out the dustbin, and this warrants the boy's correction.

If children do diagnose and correct their partner's mistaken beliefs, we would expect them to provide corrective feedback when there is an obvious danger of their partner entertaining a false belief and to omit such feedback if there is no such danger. This prediction formed the basis of the present study. In order to observe such corrective feedback, we constructed a procedure that was a variant on two standard tasks for assessing false beliefs: the unexpected transfer task (Wimmer & Perner, 1983); and the Smartie-box task (Perner et al., 1987). The child's conversation partner was absent from the room when the contents of a familiar and easily recognisable container (a pencil-case) were removed and transferred to a less familiar, and less likely container (a plain box). Children witnessing this switch could reasonably assume that their conversation partner, who had not seen it, would on approaching the two boxes mistakenly expect pencils to be located in the pencil-case rather than in the plain box. We observed what children said when their partner announced that she needed to find a pencil. More specifically, we observed how readily children offered corrective feedback to their partner by pointing out that the pencils were not in the pencil-case but in the plain box. For comparison purposes, a control condition was also run in which the pencils remained in the pencil-case, obviating any need for corrective feedback. It was anticipated that children would be more likely to offer corrective feedback in the switched condition as compared to the control or standard condition. To the extent that older children are more likely to diagnose a false belief accurately, we also anticipated that this difference between the two conditions would be more evident among 5-year-olds as compared with 3-year-olds.

METHOD

Participants

A total of 56 children was included in the final sample, equally divided into a younger group (14 girls; 14 boys) with a mean age of 3 years 6 months (range 35–48 months) and an older group (14 boys; 14 girls) with a mean age of 5 years 3 months (range 57–74 months). One additional 3-year-old was tested but forgot the location of the pencils and was therefore not included in the final sample. Children were recruited from two preschools and one primary school in the suburbs of the city of Amsterdam, The Netherlands. The

children came from families that ranged from working to middle class. All were fluent in Dutch, the language in which testing was carried out.

Procedure

The children were individually tested by a team of two female experimenters in a quiet room at their school or preschool. The whole session was recorded by a concealed camera. After the children were put at ease, the first experimenter asked them to make a drawing of a house with a number of colouring pencils that were put as a loose set in front of them. Once they had finished this task children were routinely told: "That's a very good drawing. I like it very much. Now can you help me tidy up? Here are two boxes". At this point, the experimenter put the pencil-case (from which the pencils had originally been taken) and a somewhat larger plain box in front of the subject. She pointed to the pencil-case and said: "Ah, this looks like a proper box for the pencils. Look, the pencils are shown on the lid. Can you put all the pencils in this box?"

The children were randomly assigned to a *standard* and a *switched* condition (7 girls and 7 boys from each age group in each condition). The children in the standard condition drew with the original set of 12 pencils. In the switched condition, however, 3 additional pencils had been added to the set so that the entire set of 15 pencils would no longer fit into the original pencil-case. For this group, the experimenter said (when it became apparent that the pencils would not fit): "Oh dear, there are too many pencils. What can we do? Let's use the other box. It's not a proper pencil box, but it will do. Can you put the pencils in that one? Once the child had finished putting the pencils in the box (i.e. the pencil-case in the standard condition and the plain box in the switched condition), she concluded by saying: "Good, now let's leave everything ready on the table for the next child". At this point, the second experimenter entered the room.

The first experimenter showed her the drawing saying: "Look what a nice drawing [child's name] has made . . .", and then left the room ". . . to fetch the next child". The second experimenter looked at the drawing admiringly and made some comments. Once she was sure that she had the child's attention, she said: "Well, because you've done such a nice drawing, I would like to give you a small present. Look, what I've got for you!" She showed the child a small eraser "puppet" that could be fitted on top of a pencil. She then presented a series of prompts. After each prompt, she waited for two seconds for a reaction from the child. If the child failed to indicate the location of the pencils, the experimenter went on to the next prompt. This pace was judged sufficient to give the child an opportunity to respond without introducing artificially long silences into an otherwise normal conversation.

1. "Look, it's a nice little puppet, but it belongs on top of a pencil. Look—here is the hole for the pencil" [showed the opening].
2. "Ah, didn't you just make a drawing with some pencils?"
3. "Let me see. I need to find a pencil for you."
4. "Uhhmm … here's a real pencil-box."

If the child did not produce an appropriate reaction at this point, the experimenter checked whether the child remembered the true state of affairs by asking:

5. "Are there pencils in this box?"

One of the 3-year-olds did not answer this question correctly and was therefore replaced by another subject. After the experiment, children were thanked for their co-operation and given the puppet complete with a pencil.

RESULTS

Table 1 shows the number of children who spontaneously indicated (verbally and/or nonverbally) the location of the pencils either before any of the prompts or following each of the five prompts as a function of age and condition.

In the standard condition, all but one of the 5-year-olds indicated the location of the pencils only after the fifth prompt (when they were explicitly asked about their location) whereas in the switched condition half of the 5-year-olds indicated the location before the fifth prompt. A Fisher exact probability test, in which the proportion of reactions before and after the

TABLE 1
The Number of Children who indicated the Location of the Pencils after Each Prompt as a Function of Age and Condition

	Number of Necessary Prompts						
Age	*0*[a]	*1*	*2*	*3*	*4*	*5*[b]	*N*
3-year-olds							
Standard	0	5	0	2	1	6	14
Switched	1	3	0	5	2	3	14
5-year-olds							
Standard	0	0	0	1	0	13	14
Switched	0	0	0	4	3	7	14

[a] Child who took a pencil out of the box before any of the prompts were provided.

[b] Children who did not help spontaneously, but answered the direct test question correctly.

fifth prompt were compared across the two conditions confirmed that this difference was significant ($P < .025$).

A different pattern emerged for the 3-year-olds: The majority indicated the location of the pencils before the fifth prompt in both conditions. This trend was slightly more obvious in the switched condition, but a Fisher exact probability test revealed no significant effect of condition for the 3-year-olds. However, closer inspection of Table 1 reveals an unexpected finding among nine of the younger children. Although none of the older group reacted before the third prompt when the plan to give a pencil to the child was made explicit ("Let me see. I need to find a pencil for you"), implying that the two earlier prompts were too indirect to clarify the experimenter's intention, nine 3-year-olds offered information at a very early stage, namely, before the second prompt. Almost all of these early reactions involved children who grasped, or at least tried to grasp, the pencil themselves—a nonverbal action that was not necessarily an attempt to help the experimenter or an acknowledgement that help was needed. Admittedly, in so doing, children revealed the location of the pencils but that was a by-product of their search rather than an attempt to provide the experimenter with information. By contrast, the other children, 3- and 5-year-olds alike, typically revealed their intention to help by pointing at the correct box rather than opening it, sometimes accompanied by a remark such as: "Here [are the pencils]".

If these nine children are excluded from the younger group, the remaining 3-year-olds displayed the same trend as the 5-year-olds but given the smaller number of children involved the trend was not significant by Fisher exact probability test. In order to assess the overall pattern of the findings, the nineteen 3-year-olds were combined with the entire group of 5-year-olds. Logistic regression analysis (SPSS) was used to examine the effects of Age and Condition on the proportion of children who provided information to their conversation partner, either before (score = 0) or after (score = 1) the fifth prompt. We started with a saturated model in which both main effects and their interaction were entered as independent variables. This analysis revealed that the interaction effect of Condition × Age did not reach significance ($G^2 = 0.468$, $df = 1$, $P = .494$). Once this interaction effect was removed from the model, the main effect of Condition was clearly significant ($G^2 = 9.035$, $df = 1$, $P = .003$) and the main effect of Age was marginally significant ($G^2 = 3.100$, $df = 1$, $P = .078$).

When this analysis was repeated on the entire sample, a similar pattern emerged. After removal of the nonsignificant interaction effect ($G^2 = 1.261$, $df = 1$, $P = .262$), there was a significant effect of Condition ($G^2 = 7.124$, $df = 1$, $P = .008$) and of Age ($G^2 = 10.120$, $df = 1$, $P = .002$). We may draw two conclusions. First, irrespective of age, children were more likely to provide information before the fifth prompt in the switched as compared with the

standard condition; second, irrespective of condition, younger children were more likely than older children to provide information before the fifth prompt.

DISCUSSION

The pattern of help provided by children varied across the two conditions suggesting that children took their interlocutor's knowledge-base into account. This effect was clear among the older children, but a similar trend appeared among those younger children who informed the experimenter rather than searching themselves for the pencils. The first two prompts were ineffective, but when the adult, after clearly stating her intention "to find the pencils" in prompt 3, appeared likely to be misled by the switched location, children often foresaw this problem and supplied information about the actual location before being explicitly asked for that information in prompt 5. In the standard condition, on the other hand, in which the pencils could be found in their proper box, children assumed that the adult would be able to find them. In these circumstances, they were likely to withhold information about the location of the pencils until explicitly asked about their location in the final prompt.

As we indicated in the introduction, studies that have focused on children's developing understanding of belief have, almost without exception, included a direct invitation to supply a judgement regarding someone's belief. By contrast, in the present task, children were not explicitly asked to say what the adult thought nor warned that the adult needed to know. Nevertheless, children supplied—or withheld—information in accordance with the adult's likely knowledge-base. It is worth emphasising that care was taken to avoid the introduction of long periods of silence between one experimental prompt and the next (see method section). Arguably, children might have provided more information if the experimenter had remained silent for longer. For the moment, however, the findings indicate that children spontaneously diagnose and correct the beliefs of another person even when the conversation includes no explicit verbal request for information (until the final prompt) and only weak nonverbal prompting, in the form of brief pauses by an interlocutor.

Earlier research has shown that young children, especially 4- and 5-year-olds, are capable of making two different judgements about another person's beliefs. They realise that when someone is shown a familiar and distinctive container such as a Smartie-box, he/she will expect it to contain its standard contents. Children also realise that if those contents have been removed without warning, the person will continue to hold the same expectation about the likely contents, even though that expectation is actually false (Gopnik & Astington, 1988; Perner et al., 1987; Wimmer &

Hartl, 1991). Both of these judgements appear to have been at work in the present study. In the standard condition, when the pencils were put in a familiar and distinctive container, children were likely to leave the adult to find the pencils for herself. Indeed, among the 5-year-olds, only one child supplied information about their location before being explicitly asked to do so. The implication is that children assumed that the adult would realise that the pencils were in the pencil-box; such an expectation was reasonable because the pencil-case had a picture of pencils on it, and had been categorised as a pencil-case in the course of the interaction with the first experimenter.

It is possible, of course, that older children remained silent because they did not want to appear impolite by being too eager to have a pencil. Certainly, no older child took matters "into their own hands" as did some of the younger children, and even as compared to the remaining 3-year-olds, older children needed more prompts to offer information. However, the behaviour of the older children cannot be entirely attributed to a politeness rule because in that case, a similar pattern (i.e. withholding information until the fifth and final prompt) should have been observed in both conditions. However, in the switched condition children were likely to draw attention to the switch of location before being explicitly asked whether the pencils were in the pencil-case. Although the first two prompts proved to be ineffective in eliciting a reaction, children spontaneously intervened when the experimenter made it clear that she wanted to find a pencil for the child (i.e. prompt 3: "Let me see. I need to find a pencil for you") or when she focused on the (empty) pencil-case (i.e. prompt 4: "Uhhmm … here's a real pencil-box").

The performance of the younger children needs to be interpreted with caution especially since a small subsample of younger children showed an unexpected reaction. A possible interpretation consistent with much of the research on children's developing understanding of belief, is that the 3-year-olds did not assess what the experimenter might infer about the location of the pencils. Instead, knowing the location of the pencils themselves, they egocentrically assumed (in both conditions) that the experimenter shared that knowledge. This would be consistent with the standard error pattern in false-belief tasks in which children attribute knowledge to someone, even if that person has not had perceptual access to some critical piece of information. However, inspection of Table 1 undermines this interpretation. Had children assumed that the experimenter knew the location of the pencils, they should have supplied that information only after prompt 5, as did almost all of the 5-year-olds in the standard condition. Yet only a minority of 3-year-olds adopted this tactic in either condition. Indeed, even if we focus on 3-year-olds who did not take

matters "into their own hands", they still supplied information somewhat earlier than older children.

A second possibility is that 3-year-olds *did* try to analyse the situation from the interlocutor's perspective, but used the simple rule that: "Not Seeing = Not Knowing". Because the second experimenter had not seen the pencils being put into either of the two boxes, she would have no knowledge of their location. This line of argument implies that 3-year-olds overlook the possibility that their interlocutor will be guided by the external appearance of the pencil-case to search there for pencils and assume instead that she has no idea where they are. Inspection of Table 1 provides some support for this interpretation because the majority of 3-year-olds in each condition responded before prompt 5.

We cannot rule out this second interpretation, but a third possibility is also plausible. First, recall that many 3-year-olds took matters "into their own hands" and searched for a pencil. This impulse may have masked a sensitivity to the experimenter's likely beliefs. That such a sensitivity exists is suggested by the trend observed in the remaining 3-year-olds. However, in arguing that the behaviour of this latter group reflects the level of understanding of all 3-year-olds, we must assume that the impulsive reaction pattern does not reflect a limitation in theory of mind abilities. This conclusion seems plausible in the light of findings by Lalonde and Chandler (1995). They distinguished between mastery of social conventions or the exercise of self-control, on the one hand, and more mentalistic or empathic social competence on the other (p. 167). None of the abilities from the first cluster showed any relation to the children's understanding of false beliefs. Therefore, we may conclude that the theory of mind of the nine excluded 3-year-olds was no less advanced than that of the remaining 3-year-olds. Nevertheless, given the small number of subjects in the latter group, our conclusions regarding their sensitivity to the experimenter's beliefs must remain tentative. In future research, it will be important to devise a procedure in which children cannot retrieve the missing items themselves. This will allow us to assess whether 3-year-olds do ignore the interlocutor's inferential abilities or can take them into account.

Finally, we may turn to the broader question of the relation between the development of language and the development of a child's theory of mind. We discern two major positions in the contemporary literature. First, some theorists propose that advances in the child's acquisition of a theory of mind facilitate the child's acquisition and use of language. For example, as noted in the introduction, Happé (1993) argues that advances in children's understanding of intention aids the comprehension of figurative language. By contrast, other theorists have proposed that children's limited language skills may mask an otherwise intact understanding of mind. For example, Siegal and his colleagues (Siegal & Beattie, 1991; Siegal & Peterson, 1994)

argue that the assumptions that young children bring to a conversation may mask their understanding of belief.

Notwithstanding radical differences among these various proposals, they all carry no implication that the development of children's understanding of mind is affected by the development of language. In the case of Happé (1993), it is assumed that any causal influence works in the opposite direction—developments in the child's understanding of mind affect the development of language. In the case of Siegal and Peterson (1994), it is assumed that the age-change in children's understanding of beliefs is more apparent than real, so that there is no genuine development to explain, whether by the development of language or otherwise.

In contrast to these proposals, we speculate that children's engagement in conversation does have an important impact on their understanding of mind. Admittedly, other authors have made this type of claim (Dunn, 1994; Smith, 1996). However, they have emphasised the possibility that the explicit verbal identification of particular mental states facilitates the child's understanding of mind. By contrast, we would argue that even when a conversation includes no explicit reference to any mental state, it can nonetheless provide an important context in which to discover that your interlocutor does not have the same knowledge and beliefs as yourself (Harris, 1996). For example, each time children pose a simple question (e.g. "Where's Daddy?") and receive an informative reply (e.g. "In the kitchen"), they receive a demonstration that their knowledge base is not equivalent to that of another person. Sometimes, as in the foregoing exchange, they are ignorant of some piece of information that their interlocutor knows. At other times, the roles will be reversed, and they can provide information to their interlocutor. More generally, we assume that the opportunity to participate in conversation is likely to augment children's sensitivity to variation among people in what they know and believe, whereas obstacles to such participation is likely to delay that sensitivity. Consistent with this argument, it is noteworthy that deaf children have recently been shown to have difficulties with the false belief task (Peterson & Siegel, 1995).

Whatever the ultimate merits of this speculation about causal links between participation in conversation and the development of a theory of mind, the present results highlight the fact that communication often calls for an assessment of what an interlocutor believes. In that respect, the study of children's communication skills may be seen as an important, albeit neglected, context in which to observe their sensitivity to other people's beliefs.

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